

Technical Memorandum



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To: Dan Riordan, City of Forest Grove
From: Brian Davis, Jessica Hjar, & Gregory Mallon
Date: November 13, 2019
Subject: Forest Grove Parking Study Preliminary Analysis

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Overview

In order to gain an understanding of parking operations within downtown Forest Grove, a detailed study of parking supply, demand, and utilization patterns was conducted. The primary study days were Saturday, August 17th, 2019 and Thursday, August 22nd, 2019. These days were selected to provide a picture of parking demand during a typical weekday, and a busy weekend which featured an event downtown (the *Forest Grove UnCorked* festival). The results of this analysis will inform management recommendations as this plan evolves, and can be used to project potential revenues and maintenance needs.

Study Area and Methodology

The study area entails the downtown area of Forest Grove, which includes 48 block faces and 7 public parking lots. The study area is bounded by A street to the west, 19th Avenue to the south, Cedar Street to the east, and University Avenue to the north. A variety of land uses are present in this area, including residential, retail, restaurant, office, and school. To evaluate how parking usage varies between the different contexts, the study area was initially divided into four subareas:

City Center: The City Center subarea encompasses Main Street, 21st Avenue, and Pacific Avenue which front many different types of retail and restaurant uses. Because of the central location and the mix of nearby land uses, it is expected that this subarea will generally be the busiest and may also display the most complex demand patterns. The subarea consists of 18 block faces.

Northwest: The Northwest subarea is comprised of block-faces along 21st Avenue, 22nd Avenue, and A Street. Land uses within this subarea are primarily residential in nature, and it is expected that residential uses drive parking demand within the subarea. The subarea consists of 10 block faces, with four blocks designated as no parking.

Northeast: The Northeast subarea is comprised of 8 block-faces along College Way and Pacific Avenue, including two long “superblock” faces, directly in front of Pacific University. While these blocks do not encompass all available parking for Pacific University, it is assumed that demand for these blocks is generally driven by the University.



South: The South subarea encompasses 14 block-faces along 19th Avenue, Ash Street, and A Street. There are a number of uses within the subarea including retail uses, the police department, fire department, and some city offices and other employment uses. The mix of uses is somewhat similar to the City Center subarea, albeit with employment uses expected to generate more of the demand observed within the subarea than within the City Center subarea.

The study area and districts are shown in Figure 1; the data collection methodologies of each study area are described in the following section.

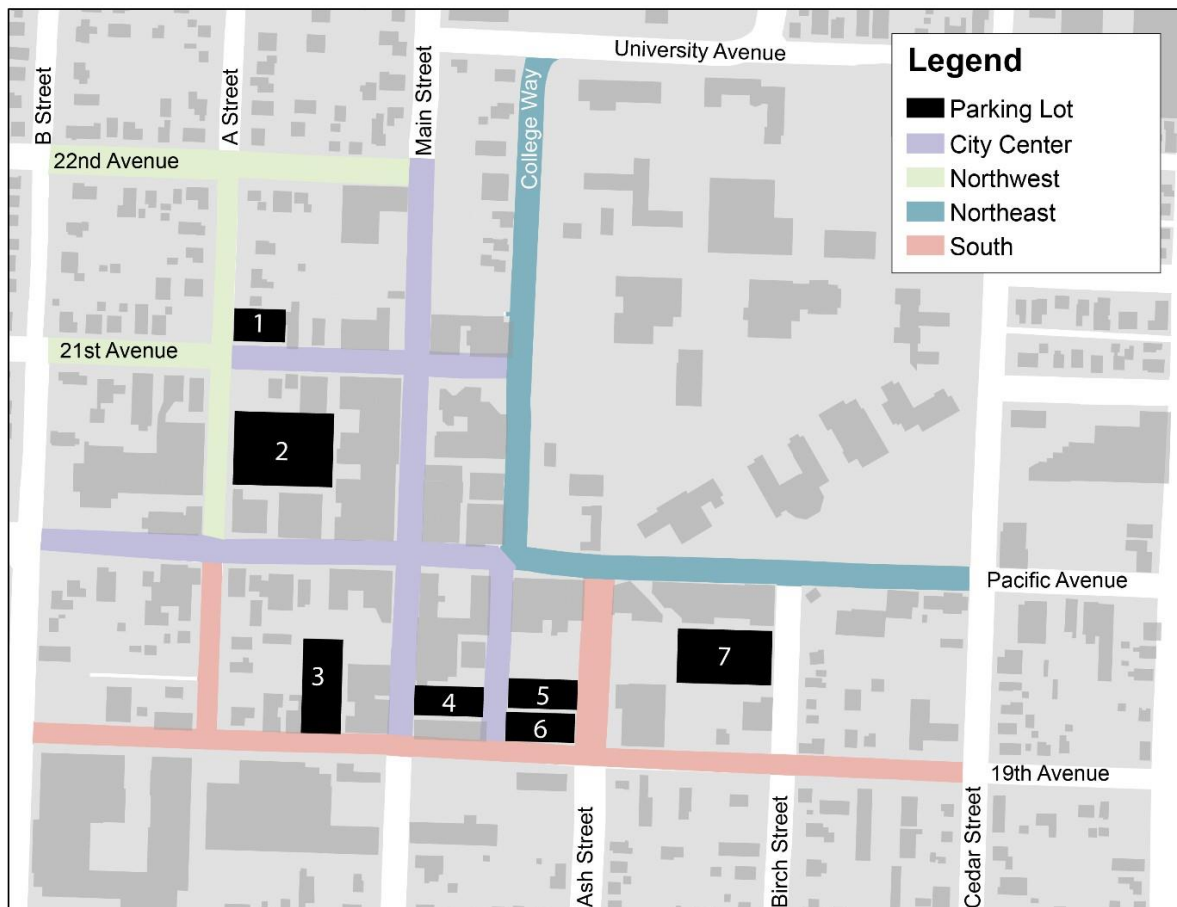


Figure 1: Forest Grove Downtown Parking Study Area



Parking Supply Inventory

The methodology employed for this analysis consisted of two steps: an inventory of parking supply, including the number and types of stalls, followed by occupancy and demand observations intended to identify the peak demand periods as well as less busy times.

To complete the first step, an inventory of the supply of parking stalls was conducted, tracking the number and location of parking spaces along each block face in the study area, as well as designated users, maximum time stays, and other pertinent information as possible. Locations and capacities of parking lots were recorded. The inventory was conducted utilizing a tablet PC. The data collected in this step were used to set up data collection tools in the form of spreadsheets, to be used during the parking demand data collection.

The study area includes the following types of parking stalls:

- **2-Hour:** Spaces that allow for time stays up to two hours between 8:00 am to 5:00 pm.
- **4-Hour:** Spaces that allow for time stays up to four hours and residential permit zone.
- **Unregulated:** Spaces that have no restrictions on the amount of time a vehicle stays
- **Disabled:** Spaces reserved for use by those displaying a disabled placard, license plate, or other legal permit
- **Electric Vehicle:** Spaces that have charging stations for electric vehicles
- **School Parking:** Spaces that are reserved for school/university traffic during certain times of the day
- **Unregulated:** Stalls that do not have time limits or use restrictions. Like the 3-hour stalls, these stalls were re-signed as 2-hour stalls after data collection occurred.

The breakdown of parking stall types within the study area is shown in Table 1.



Table 1: Study Area Parking Stall Breakdown

Parking Stall Location	Timed Stalls	ADA Stalls	EV Stalls	School Stalls	Unregulated Stalls	Total
On-Street	450	3	4	0	118	575
Parking Lot	57	12	4	7	122	202
Total	629	15	8	7	240	777

Demand Observations

Following the inventory step, parking demand data were collected. Two data collection routes were established that encompass all four study areas and seven public parking lots. Since detailed information is required for the City Center subarea in order to calculate the number of unique vehicles and percent overstay, all blocks within the City Center subarea were included in one route. Route 1 consists of all 18 block faces located in the City Center subarea and five public parking lots. The length of Route 1 measured approximately one and a half miles. The length and configuration of this route was designed such that the data collector was able to walk and collect data over the entire route once per hour without needing to work excessively quick. Each parking space within the study area was thus visited once per hour during the study periods.

The second route included all remaining block faces in the Northwest, Northeast, and South subareas and two public parking lots. Route 2 consists of approximately 28 block faces and two public parking lots. The length of Route 2 measured approximately three miles. The length and configuration of this route was designed such that the data collector was able to walk and collect data at times corresponding to the peak hours for the specific land uses in each subarea. The subareas are defined in Figure 1 on page 2; Figure 2 on the following page shows Route 1 highlighted in red and Route 2 highlighted in blue.

The data for both routes were collected on tablet PCs utilizing the route-optimized spreadsheets created during the inventory phase. For Route 1, the first four digits of the license plate of each vehicle parked in a stall along the route were recorded each hour to allow for analysis of both occupancy and duration of stay. For Route 2, the number of vehicles parked in each stall were recorded to allow for analysis of percent occupancy.

It is noted that the 3-hour stalls and unregulated stalls that were re-signed following data collection were analyzed based on how they were regulated when data collection occurred. For example, a stay length of between two and three hours within a 3-hour stall would *not* be recorded as an “overstay” since it was compliant with regulations that were in place when data were collected.

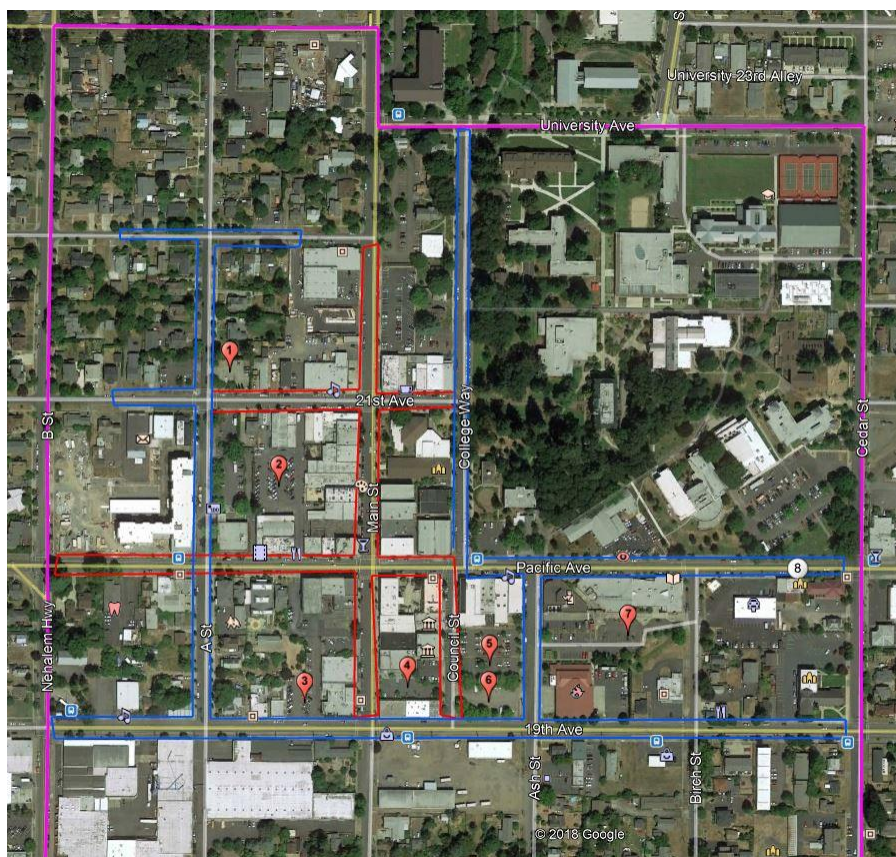


Figure 2: Data Collection Routes

Metrics

The key metrics employed in this analysis are described below:

- **Stalls** indicate number of parking spaces available on a block face, in a lot, or within a subarea. Most of the parking stalls within the study area were marked; however, where stalls were unmarked, an average stall length of 22 feet was assumed.
- **Occupancy** is a measure of how much of the parking supply of a given area is utilized, expressed as a percentage of the total parking supply. For on-street parking, parking is considered “functionally full” when occupancy levels exceed 85%; this is often indicative of a need for a change in management. The term ‘peak hour’ is used in this report to indicate the hour of the day when occupancy was observed to be the highest. The timing of the peak hour and the occupancy level



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during the peak hour relative to other times of the day reveal important information about drivers of demand.

- **Duration of stay** (or stay length) is the length of time that a particular vehicle was observed to occupy a particular parking space. Stay lengths of more than three to four hours likely indicate residential or commuter demand, while shorter stay lengths are likely to indicate demand for retail, restaurant, entertainment, or commercial uses. Since each parking space was observed once every hour, this measure has some level of uncertainty for shorter stays.
- **Unique vehicles served** refers to the number of different vehicles (based on the recorded license plate numbers) observed on a per-stall basis. This metric complements duration of stay in providing an understanding of the turnover of parking stalls. Along commercial corridors, it is desirable for parking to serve as many unique vehicles as is practical, as it indicates a high turnover of customers. A parking stall serving fewer than three unique vehicles over the study day is likely serving residential demand or a lower demand area, while three or more unique vehicles served is more likely indicative of a parking space serving commercial uses or a mix of uses. Since data were collected once per hour, the number of unique vehicles served reported therein is likely lower than the actual number of unique vehicles that utilize stalls with short time limits.
- **Percentage of overstays** is reported for stalls that have a signed maximum stay length, and refers to the percentage of vehicle that were observed to exceed the time limit. High percentage of overstays could indicate that time limits are not adequate to serve demand; conversely, they could also represent the need for more robust enforcement. As with other turnover metric, the percentage of overstays reported herein are affected by the one-hour resolution of data, and thus entail uncertainty for spaces with time limits of one hour or less.



Demand Observations and Analysis

Overall Study Area Demand: Saturday, August 17th

Data were collected between 12:00 pm and 9:00 pm on Saturday, August 17th, 2019. A graph showing the Saturday hourly percent occupancy for the entire study area is shown in Figure 3. It should be noted that while data for the City Center route were collected hourly, the times shown in the graph represent the times at which data are available for all blocks and lots within the study area.

As described previously, data collection occurred during the annual *Forest Grove UnCorked* beer and wine festival. While it is expected that this leads to demand patterns busier than a non-event Saturday, events of this sort are relatively common in downtown Forest Grove throughout the summer months and thus these results can lend insights around managing parking for events as well as typical weekend demand patterns.

It is noted that the block of Main Street between Pacific Avenue and 21st Avenue was closed to car traffic for the event; parking along this stretch was unavailable and is thus not included as available supply within the analysis that follows.

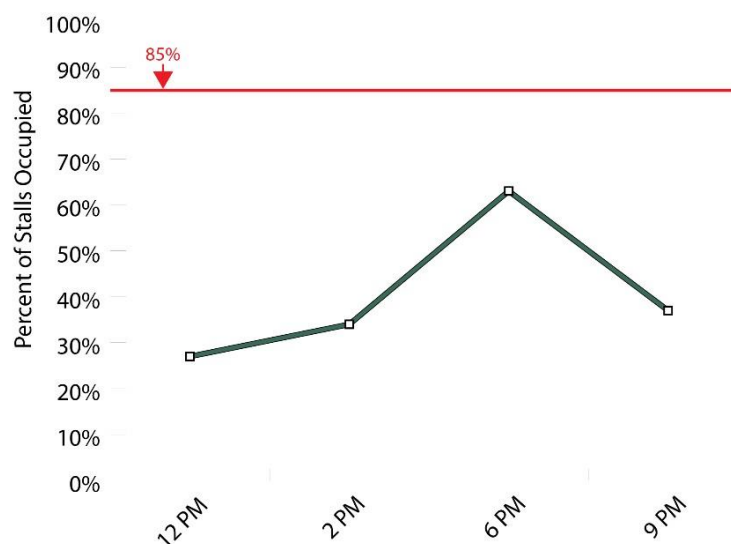


Figure 3: Saturday Percent Occupancy (Entire Study Area)



Data indicate that the peak hour for parking demand occurred at 6:00 pm. A map showing the percent occupancy of each on-street parking block and parking lot during the peak hour for Saturday is shown in Figure 4.

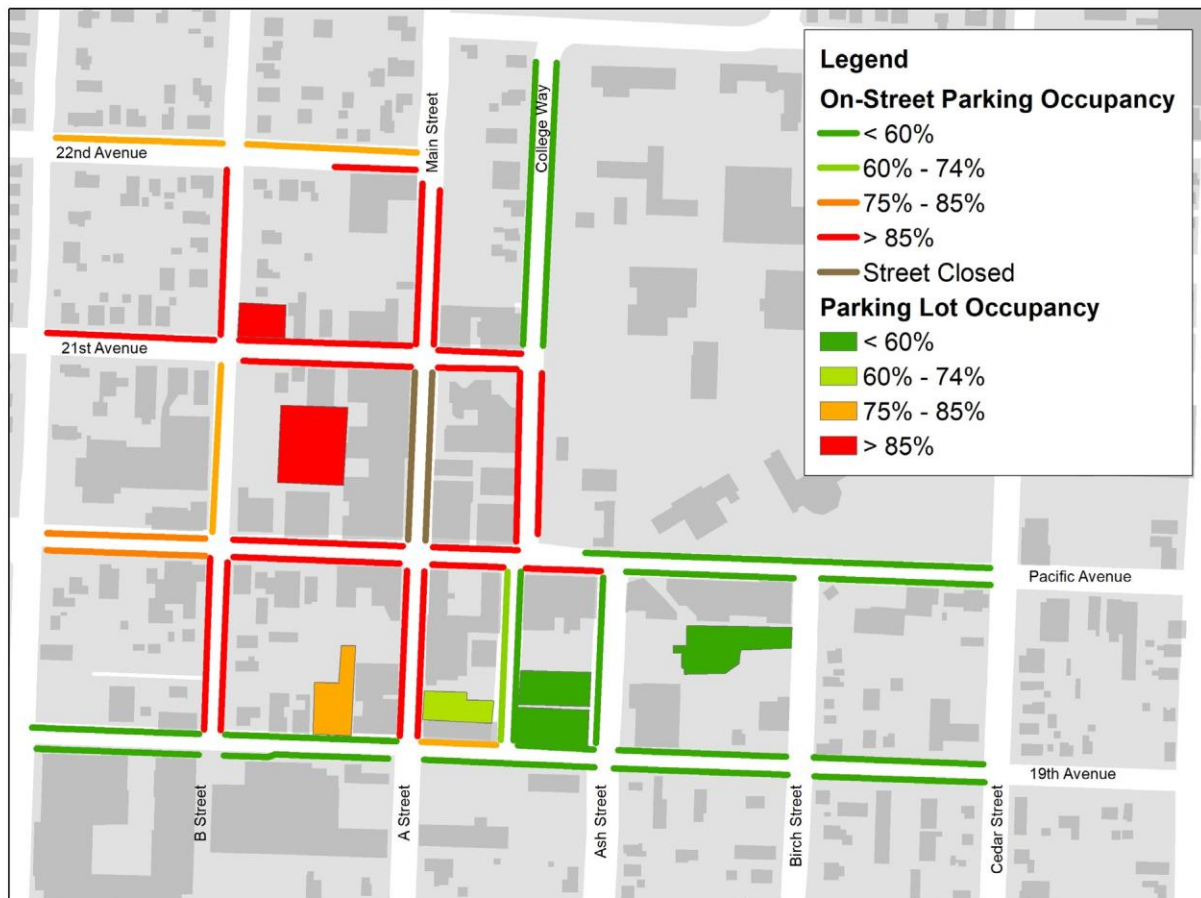


Figure 4: Saturday Peak Hour - 6:00 pm

Key Observations

- In aggregate, parking demand within downtown Forest Grove was observed to vary between about 30% and 70% over the course of the day. This indicates that there is generally enough parking supply within downtown to accommodate all current demand. However, localized shortages of parking were observed in the central parts of the study area nearest the event.



- On this day, the 11th annual Uncorked festival occurred in downtown Forest Grove, which closed two block faces of parking on Main Street. Since two blocks within the study area were closed, the parking supply for this day is lower than on Thursday.
- From the demand patterns, it is evident that the event was a key driver of demand during the study day. The observed peak hour for the study area in aggregate occurred at 6:00 pm, when a combination of festival demand and other activities within downtown including restaurant and retail uses combine. This is most noticeable within the central parts of the study area. However, there is reasonably light demand from the employment and institutional uses on the outskirts of the study area at this time, so overall demand within the study area is within reasonable levels.
- As shown in Figure 4, 20 block faces within the study area are shown to exceed 85 percent occupancy during the peak hour. These block faces are largely contiguous and lie toward the center of the study area. Similarly, the two most centrally located parking lots were observed to be full to near capacity during this peak period while the less central parking lots had remaining capacity.

City Center (Saturday)

Data were collected hourly between 12:00 pm and 9:00 pm for each parking stall. A graph showing the Saturday hourly percent occupancy for the City Center is shown in Figure 5.

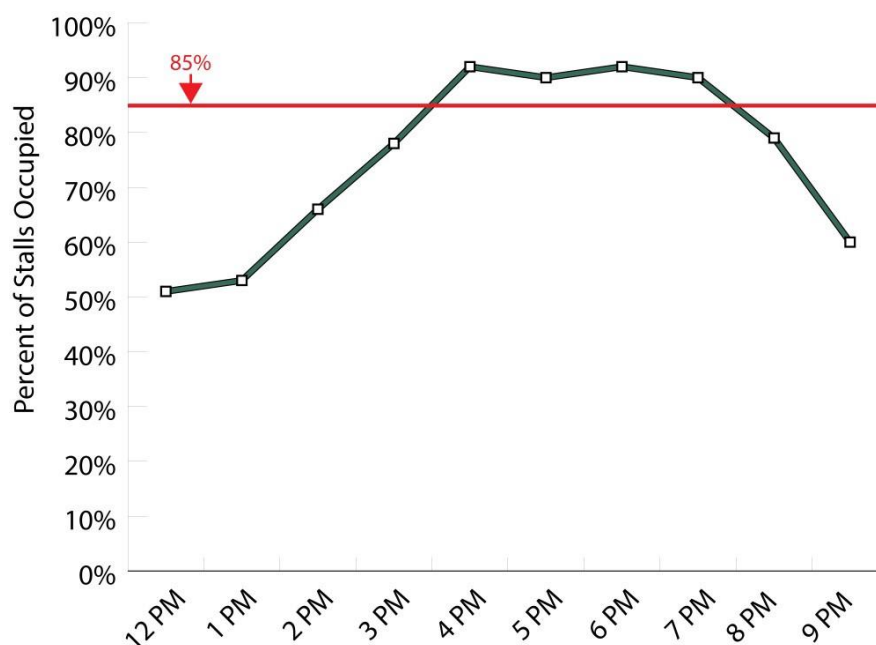


Figure 5: Saturday City Center Subarea Percent Occupancy



The data collected in the City Center subarea show more specific data regarding parking turnover. Three metrics were calculated from the hourly recorded data. Duration of vehicle stay, the number of unique vehicles, and the percentage of overstays provide information to analyze how the existing parking is functioning. A summary of these values is shown in Table 2.

Table 2: City Center Timed Stall Data Summary (Saturday)

Total Vehicles Served	Total Vehicles Exceeding Time Limit	Percent Overstay	Average Time Stay by Stall	Unique Vehicles
412	136	33%	2 hours 57 minutes	2.3 vehicles

Key Observations

- The peak demand hours for the City Center subarea were 4:00 pm and 6:00 pm. During these hours, 92% of available on-street parking was occupied. Demand was consistently high from the 4:00 pm through 7:00 pm hours, with occupancy rates above 90% for the entire period. This demand is largely driven by the event, which was open to the public between 4:00 pm and 9:00 pm.
- Average time stays were observed to be 2 hours 57 minutes over the course of the study day. Most parking within this subarea is signed as 2 hour parking; accordingly, 33% of vehicles were observed to stay longer than the signed time limits. Each stall served an average of 2.3 vehicles over the course of the study day. These metrics indicate somewhat limited turnover relative to the high demand within the subarea.
- The event closed two blockfaces that include on-street parking: both sides of Main Street between Pacific Avenue and 21st Avenue. These parking spaces were unavailable for the duration of the study day, as vendors began setting up before the study commenced at noon. It was observed that several parking stalls along 21st Avenue, Pacific Avenue, and Council Street served vehicles belonging to festival vendors. In tandem with other event traffic, it is anticipated that this observation date had a lower number of unique vehicles served and a higher percent overstays than a typical Saturday. This is a potential explanation for the relatively high stay times and percentage of vehicles exceeding the time limit for each stall, and the relatively low number of unique vehicles per stall. This is not necessarily indicative of inadequate time limits since this is most likely due to the parking demand of the special event.

Northwest Subarea (Saturday)

A graph showing the Saturday percent occupancy for the Northwest study area is shown in Figure 6.

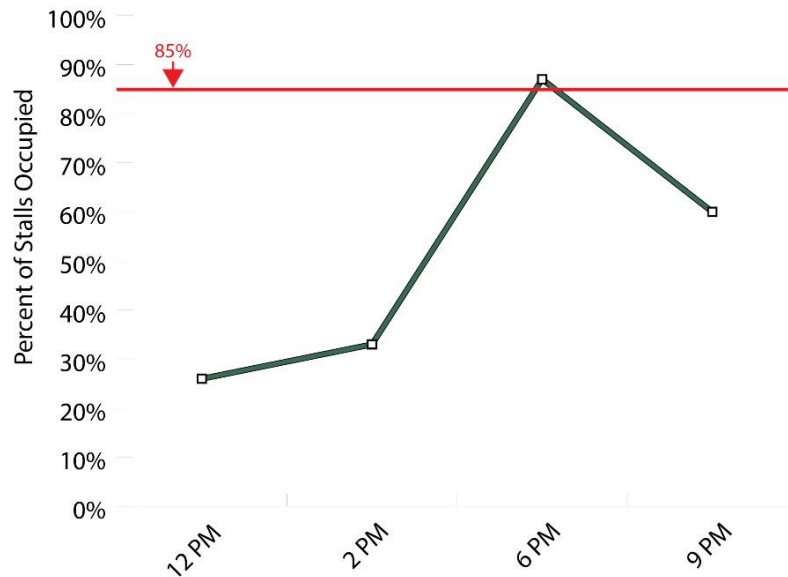


Figure 6: Saturday Northwest Subarea Percent Occupancy

Key Observations

- The peak hour this subarea occurred at 6:00 pm with 87 percent occupancy. During other observation periods, particularly those occurring before the start of the event, occupancy is much lower. This is likely indicative of event demand driving parking demand within this subarea. Based upon the proximity of the on-street parking in this subarea to the event site, it is likely that this parking fills from event traffic, or potentially other downtown uses, before the public lots south of Pacific Avenue and on-street parking in other subareas.



Northeast Subarea (Saturday)

A graph showing the Saturday percent occupancy in the Northeast subarea is shown in Figure 7.

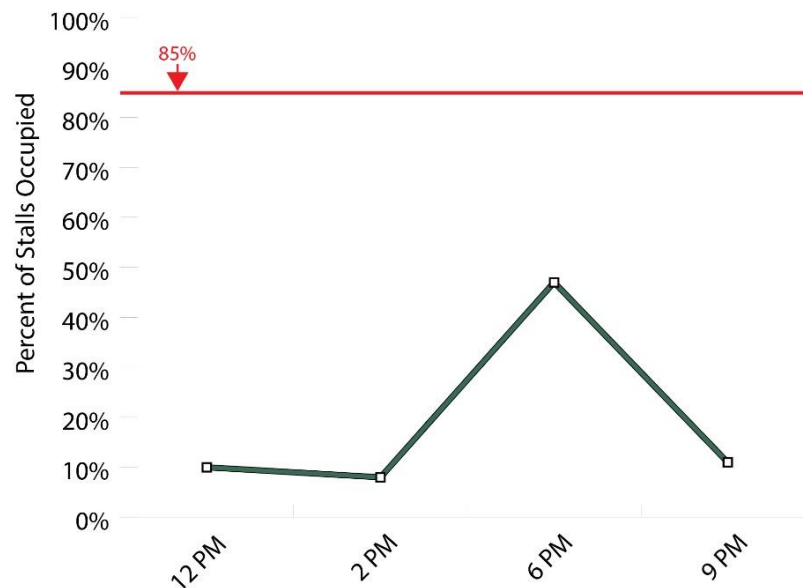


Figure 7: Saturday Northeast Subarea Percent Occupancy

Key Observations

- The peak for this subarea was at 6:00 pm with 47 percent occupancy. Like the northwest subarea, it is likely that this spike in demand is due to the event, as closer on-street parking was largely occupied during this observation period. Because relatively little activity was occurring at Pacific University during the study day, demand overall is relatively low, particularly for spaces farther away from Main Street and the event site.



South Subarea (Saturday)

A graph showing the Saturday percent occupancy in the South subarea is shown in Figure 8.

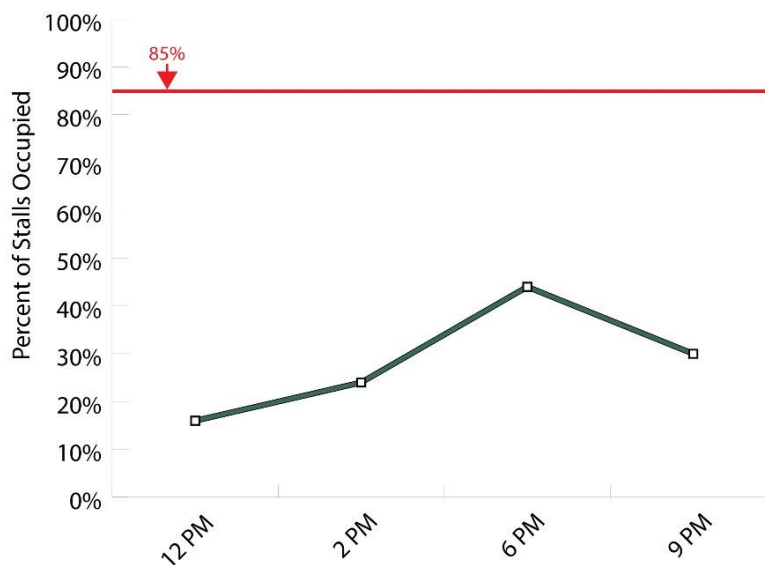


Figure 8: Saturday South Subarea Percent Occupancy

Key Observations

- The peak for this subarea was at 6:00 pm with 44 percent occupancy. The spike in demand during the peak hour is likely due to the event and other demand for downtown uses, however it is less pronounced than the spike in other outlying subareas. This is likely because other subareas include parking that is more convenient to the event, and there are few significant generators in this subarea during Saturdays.



Thursday, August 22nd

Data were collected between 10:00 am and 7:00 pm on Thursday August 22nd, 2019. A graph showing the Thursday hourly percent occupancy for the entire study area is shown in Figure 9. Again, the times shown in the graph represent the times at which data are available for all blocks and lots within the study area.

The data collected here was intended to lend insights around parking demand on a typical weekday, although it is relatively common to have special events or other non-recurring factors influence parking demand during weekdays. In this case, though classes were not yet in session at Pacific University during data collection, the study day occurred on the day of an all-day orientation for new students at the University. It is noted that this was also the first day for students to move into on-campus housing at the University. Thus, some demand from the school is captured within the analysis, although it may or may not be as intense as normal demand from the school when classes are in session.

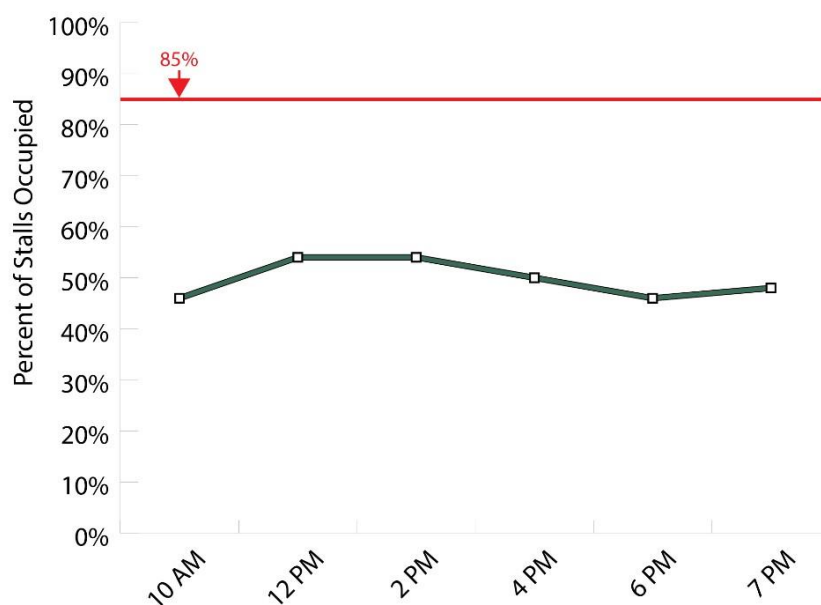


Figure 9: Thursday Percent Occupancy (Entire Study Area)

Data shows the peak hour for parking demand occurred at 12:00 pm and 7:00 pm. Maps showing the percent occupancy of each on-street parking block and parking lot during the afternoon and evening peak hours are shown in Figure 10 and Figure 11, respectively.

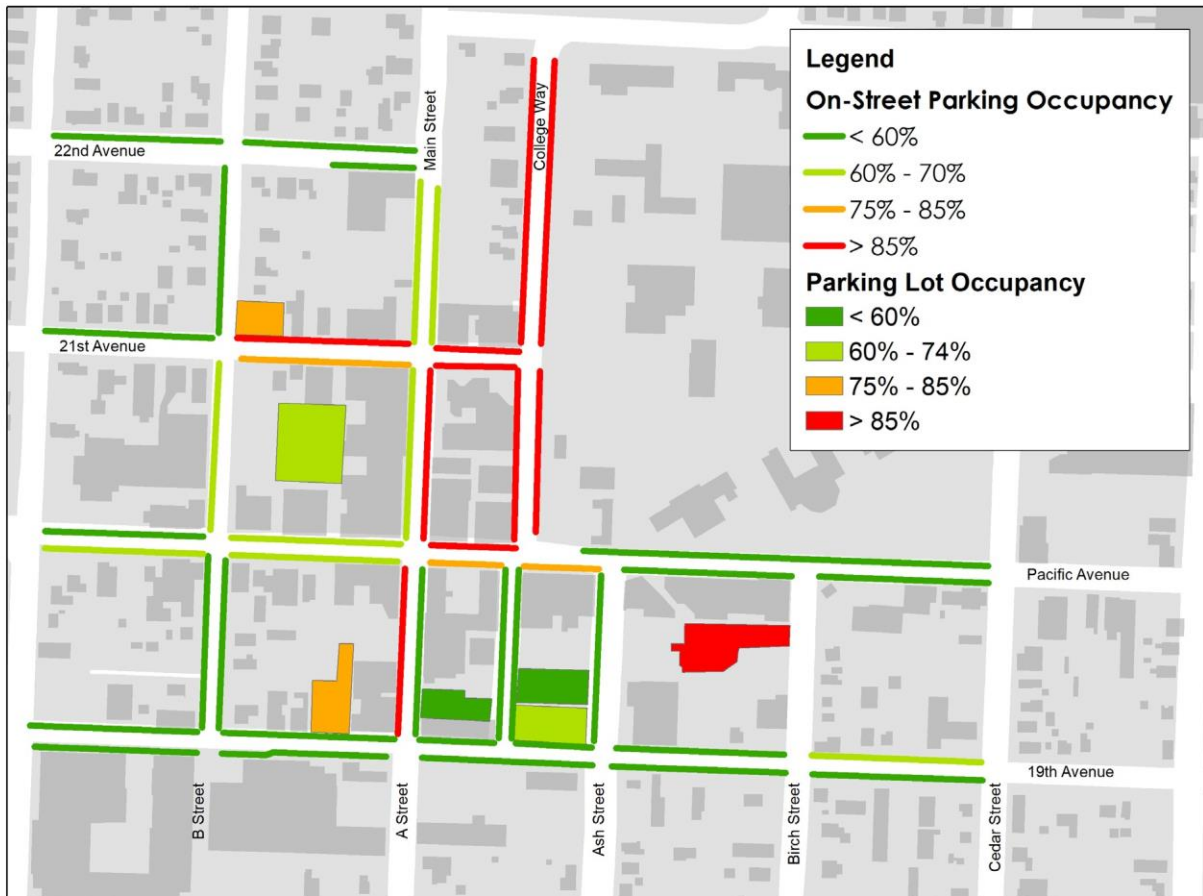


Figure 10: Thursday Peak Hour - 12:00 pm

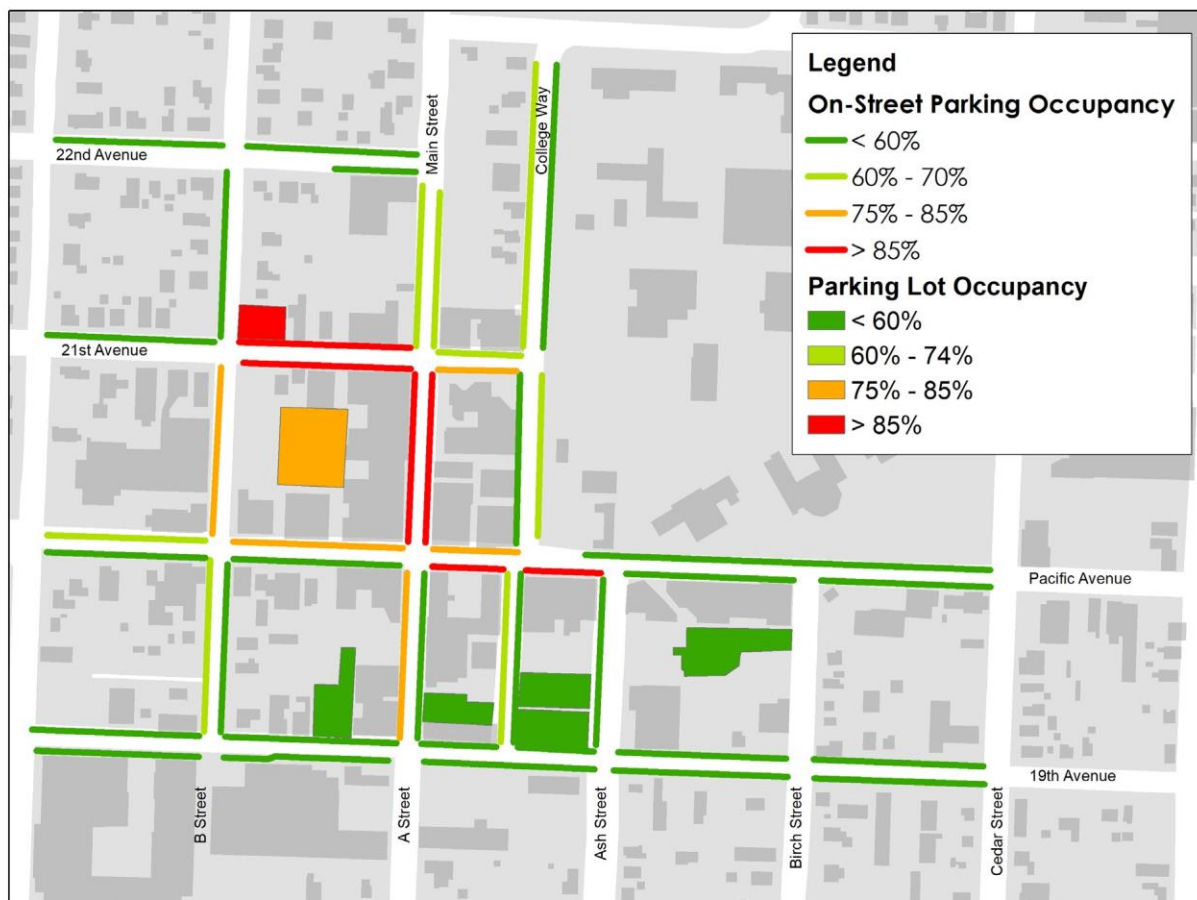


Figure 11: Thursday Peak Hour - 7:00 pm

Key Observations

- The peak hours for this day were at 12:00 pm and 7:00 pm. As shown in Figure 10 and Figure 11, the afternoon peak hour was highest in the northeast subarea and the evening peak hour was highest within the City Center subarea. Area-wide, parking demand was observed to be relatively stable throughout the study day, varying between about 45% and 60%, with only small spikes during peak hours. As with Saturday, this indicates that there is generally adequate parking supply within the downtown study area to support activities, however localized congestion is often apparent.
- During this study day, an orientation at Pacific University was taking place, and a number of people were observed to be moving into college housing. This is likely a key driver of demand for parking congestion along College Way and at the southeastern parking lot ("Parking Lot 7"), particularly



during the noon peak hour, however it is expected that typical activity explains the balance of demand observed.

- The highest demand within downtown appears to generally occur along Main Street between Pacific and 21st Avenues (along the blockfaces that were closed to traffic on the Saturday study day; the same area is closed on Wednesdays from May through October for the Farmers Market). This suggests that the centrally located retail and restaurant uses are the key factors driving most of the non-university parking demand. Outlying areas tend to see demand only once the more centrally located parking is filled, and there is ample capacity available within these outlying areas during all times of day.



City Center Subarea (Thursday)

A graph showing the Thursday percent occupancy in the City Center is shown in Figure 12.

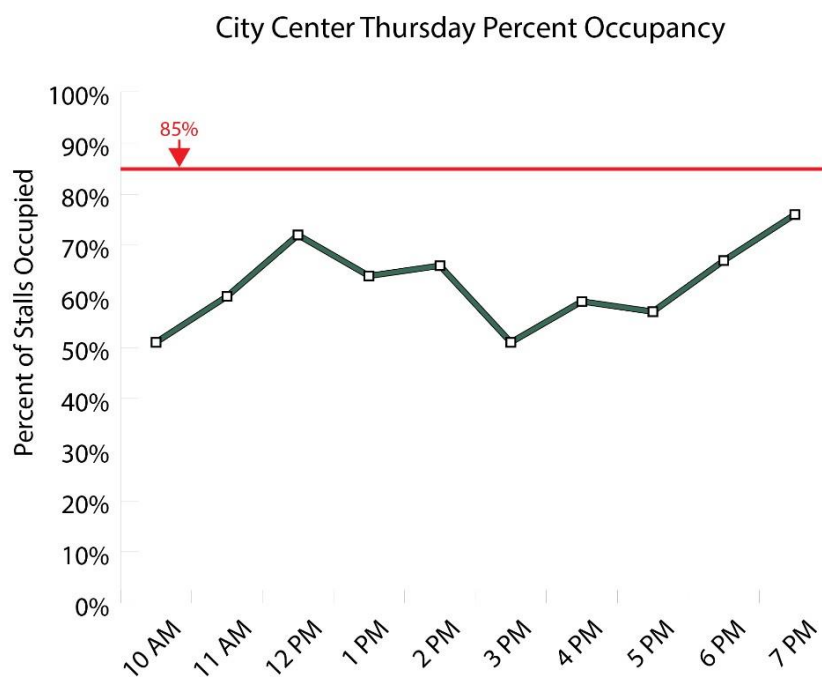


Figure 12: Thursday City Center Subarea Percent Occupancy

The calculated duration of vehicle stays, the number of unique vehicles, and the percentage of overstay for the City Center subarea on Thursday is shown below.

Table 3: City Center Timed Stall Data Summary (Thursday)

Total Vehicles Served	Total Vehicles Exceeding Time Limit	Percent Overstay	Average Time Stay by Stall	Unique Vehicles
666	85	13%	1 hour 41 minutes	3.74 vehicles



Key Observations

- The peak hours for this subarea occurred at 12:00 pm and 7:00 pm, with occupancy rates just under 80%. However, as with the study area as a whole, the centrally located blocks within City Center, particularly those along Main Street between Pacific and 21st Avenues, see greater demand than other blocks. The demand patterns indicate that the retail and restaurant uses along Main Street are driving demand patterns within the City Center subarea, however some impact from the University event is also evident.
- The average time stay within the subarea was calculated to be approximately 1 hour 41 minutes. This is below the 2-hour time limit typical of most stalls within the subarea, and accordingly, the percentage of vehicles observed to overstay the signed time limit was relatively small at 13%.
- An average of 3.74 unique vehicles per stall were served over the course of the study day. When considered in tandem with occupancy percentages, this indicates a relatively robust turnover pattern, with centrally located spaces especially offering utility throughout the study day.



Northwest Subarea (Thursday)

A graph showing the Thursday percent occupancy in the Northwest subarea is shown in Figure 13.

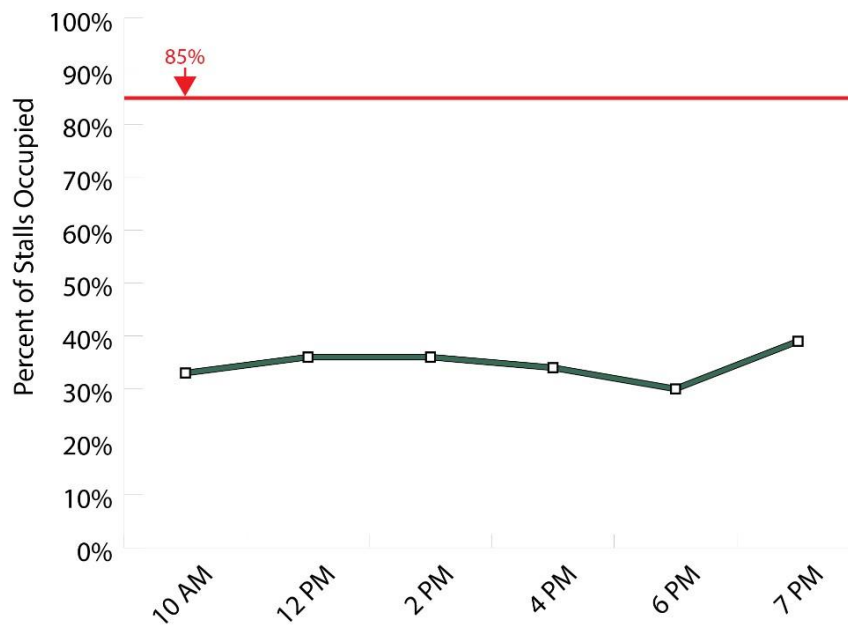


Figure 13: Thursday Northwest Subarea Percent Occupancy

Key Observations

- Demand within this subarea was observed to be relatively flat over the course of the study day, with occupancy percentages between about 30% and 45%. The peak hour occurs at 7:00 pm, immediately following the lowest observed hour at 6 pm. This is consistent with the expectation that residential uses drive demand within this subarea, however the late spike may be due to a combination of local residential demand and commercial demand from nearby uses on Main Street.



Northeast Subarea (Thursday)

A graph showing the Thursday percent occupancy in the Northeast subarea is shown in Figure 14.

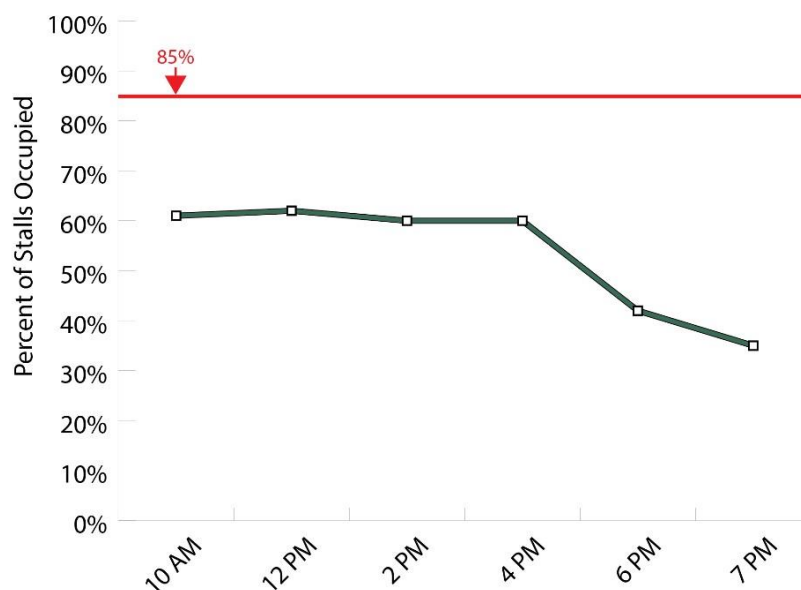


Figure 14: Thursday Northeast Subarea Percent Occupancy

Key Observations

- Demand within this subarea is relatively flat between 10:00 am and 4:00 pm at approximately 65% before falling off at 6:00 pm. This is consistent with the expectation that demand here was driven largely by the event at Pacific University. Similar demand patterns (albeit at different levels) are likely to be observed when school is in full session. Demand was concentrated within along the northwestern edge of the campus, with the parking along the southern edge showing somewhat lower occupancies. It is expected that this parking may be more in demand during the school year, generally raising occupancies within the subarea.



South Subarea (Thursday)

A graph showing the Thursday percent occupancy in the South subarea is shown in Figure 15.

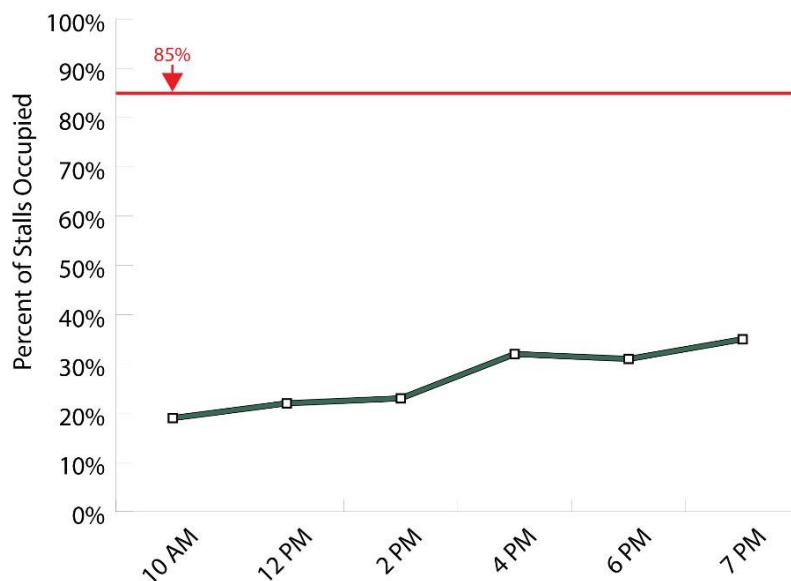


Figure 15: Thursday Employment Percent Occupancy

Key Observations

- Demand within the South subarea was relatively low throughout the study, with the peak hour occurring at 7:00 pm with just under 40% of spaces filled. While several office and employment uses lie within this district, it appears that most employees are utilizing off-street parking. Demand for on-street parking within the district is more likely driven by the handful of adjacent commercial uses, or by commercial uses within the City Center subarea as this subarea fills to near capacity.



Parking Lots

In addition to the on-street parking demand within the study area, occupancy was observed at seven public parking lots in Forest Grove. The locations of the studied lots are shown in Figure 16. It should be noted that while 85% is considered functionally full for on-street parking, that is not the case for parking lots.

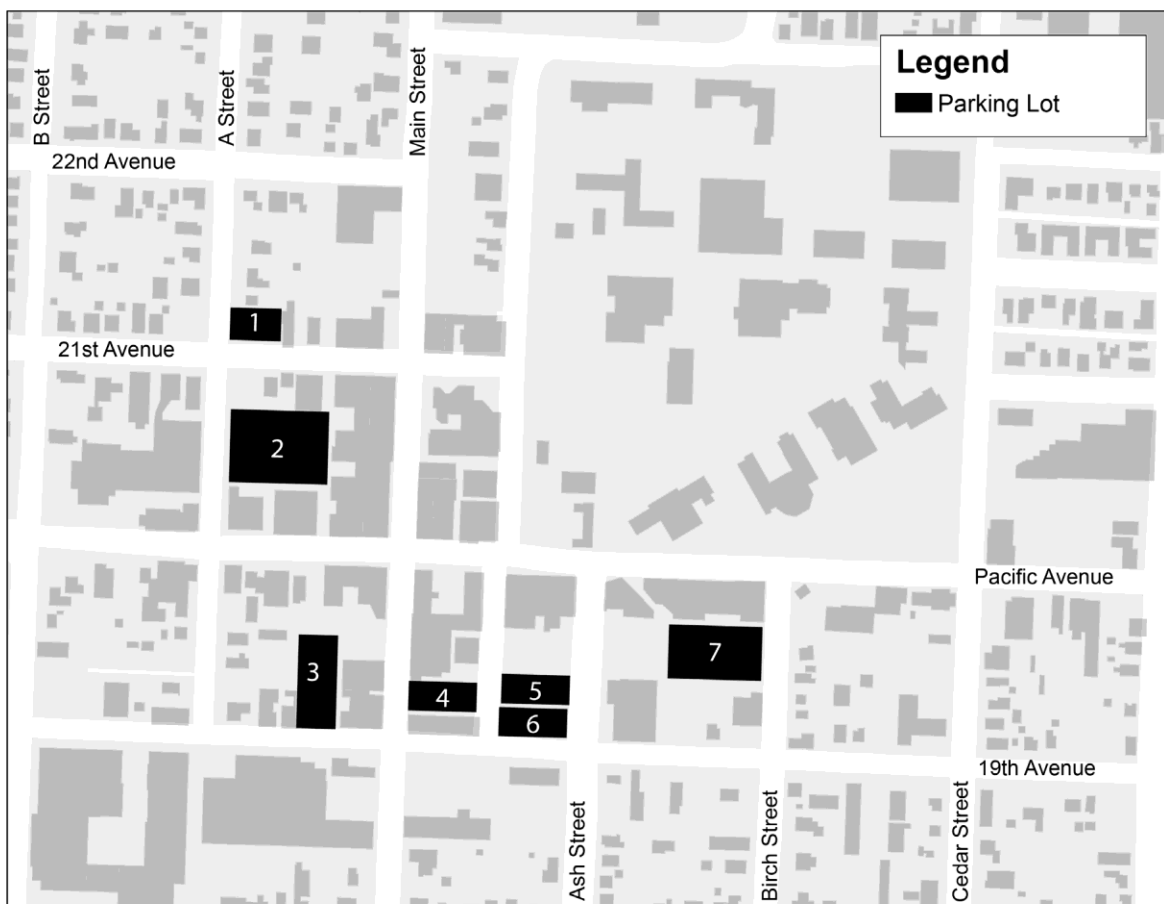


Figure 16: Public Parking Lots within Downtown Forest Grove



Parking Lot 1

Parking Lot 1 is located in the northeastern corner of the intersection of 21st Avenue at A Street. There is a total of 19 parking stalls. Parking Lot 1 was observed to be 100% full during the 4:00 pm observation and 5:00 pm observation periods on Saturday, and had significant demand at other times of both study days. This centrally located lot thus appears to be heavily utilized by both event patrons and other downtown patrons. Occupancy curves for this lot are shown in Figure 17.

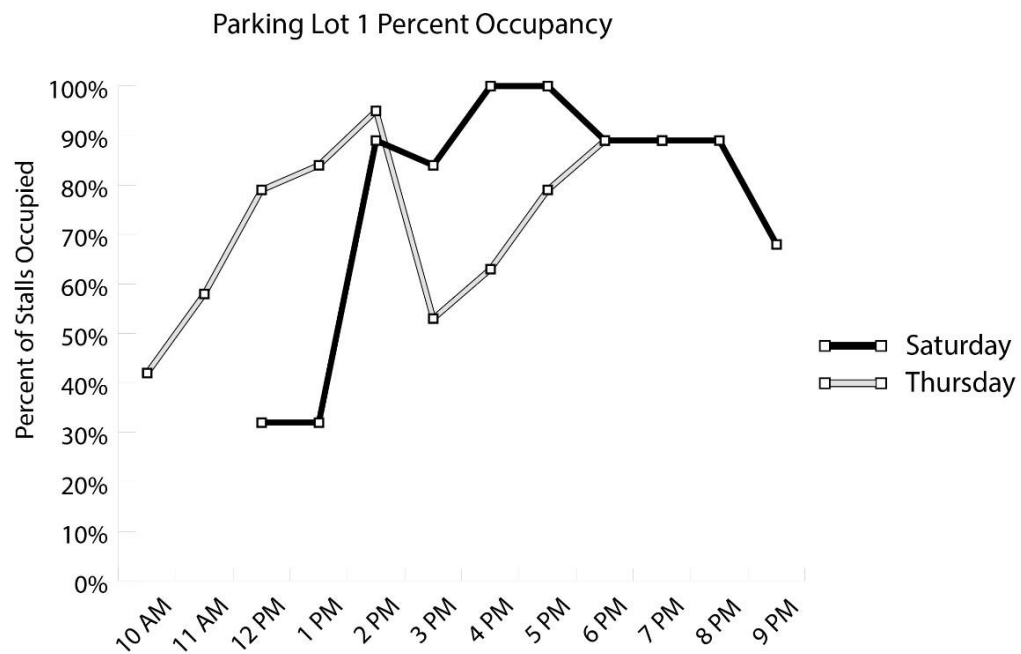


Figure 17: Parking Lot 1 Occupancy



Parking Lot 2

Parking Lot 2 is located on the eastern side of A Street, between 21st Avenue and Pacific Avenue. This parking lot has the largest amount of parking supply with 57 marked spaces. It was observed that several vehicles park in unmarked areas within the lot as well. The peak hours of demand occurred Saturday at 6:00 pm and Thursday at 7:00 pm. Parking lot 2 was observed to be 100% full on Saturday at 6:00 pm. Like Parking Lot #1, this lot served significant demand from the Saturday event. The utility for other downtown uses is also evident during the Thursday study day. Occupancy curves for this lot are shown in Figure 18.

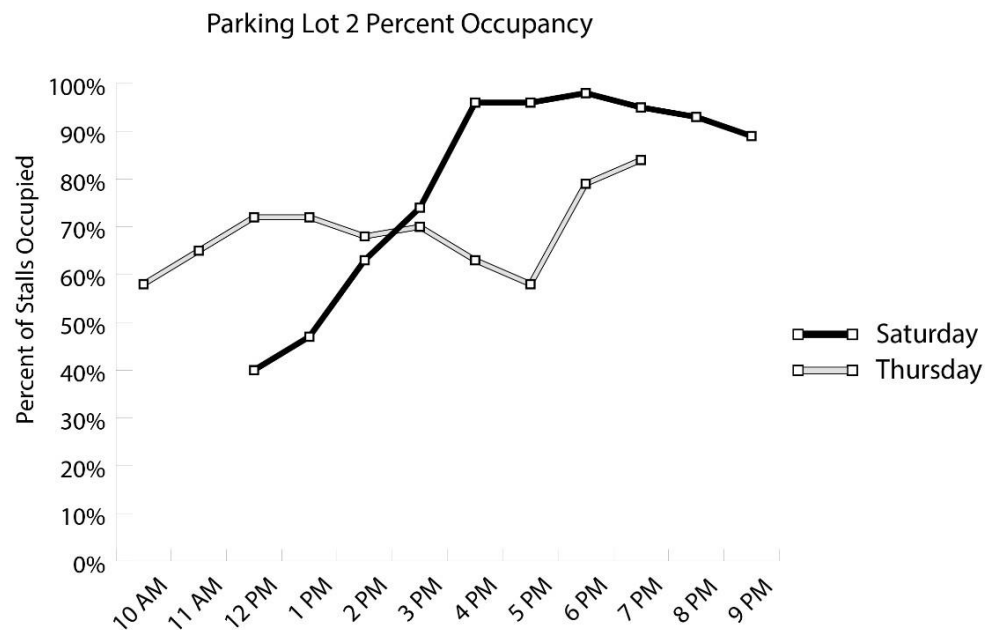


Figure 18: Parking Lot 2 Occupancy



Parking Lot 3

Parking Lot 3 is located on the northern side of 19th Avenue, between A Street and Main Street. There is a total of 31 parking stalls. The peak hours of demand occurred on Saturday at 6:00 pm and on Thursday at 12:00 pm. The utilization patterns appear to be consistent with the expectations that demand is driven by school and employment uses during the week. Occupancy curves for this lot are shown in Figure 19.

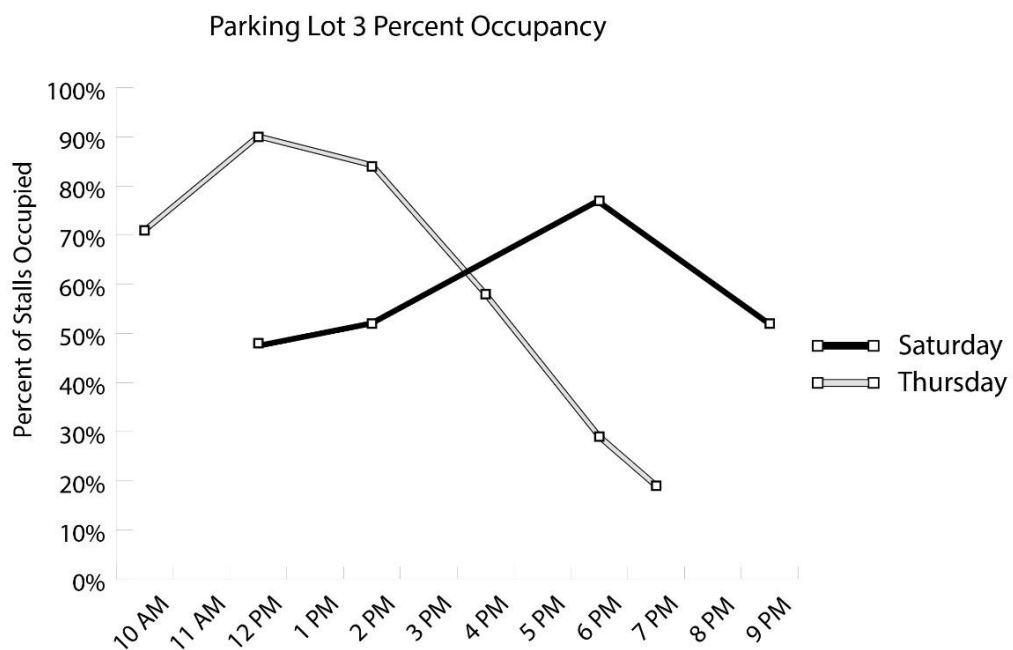


Figure 19: Parking Lot 3 Occupancy



Parking Lot 4

Parking Lot 4 is located between Main Street and Council Street. There is a total of 23 parking stalls. The peak hours occurred on Saturday at 4:00 pm and 7:00 pm and on Thursday at 2:00 pm. This lot had relatively low demand overall, but appeared to serve as spillover parking during the event on Saturday as closer parking filled. Occupancy curves for this lot are shown in Figure 20.

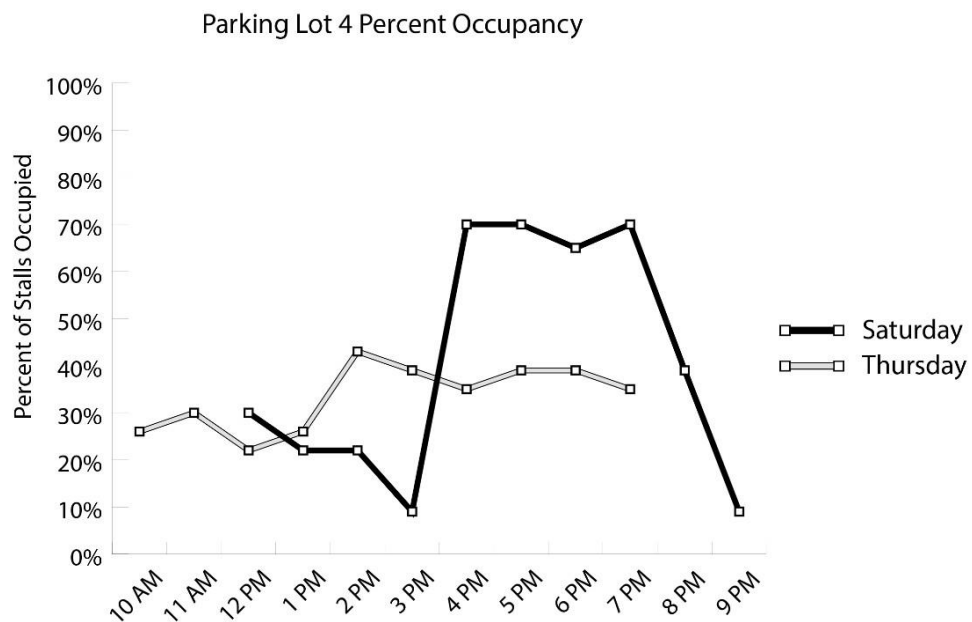


Figure 20: Parking Lot 4 Occupancy



Parking Lot 5

Parking Lot 5 is located across from Parking Lot 4 on the eastern side of Ash Street. There is a total of 16 parking stalls. The peak hour of demand occurred at 7:00 pm on Saturday and 4:00 pm on Thursday. It is not anticipated that parking for retail and restaurant uses utilize this public parking area. Demand in this parking lot was relatively low during all study periods. Occupancy curves for this lot are shown in Figure 21.

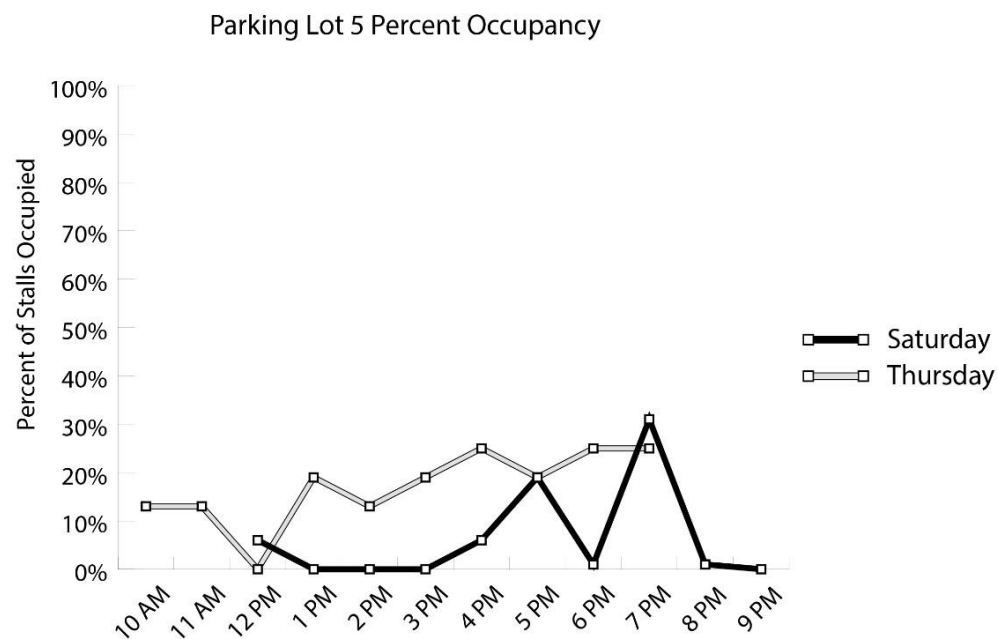


Figure 21: Parking Lot 5 Occupancy



Parking Lot 6

Parking Lot 6 is a gravel parking located on the northern side of 19th Avenue between Council Street and Ash Street, just south of Parking Lot 5. This parking lot has 33 parking stalls. Peak hours occurred at 6:00 pm on Saturday and 11:00 am on Thursday. Demand was relatively low during the entire study day on Saturday. During the Thursday study day, demand was between 70% and 80% before 5:00 pm. This is consistent with the expectation that this lot is often utilized by city employees. Occupancy curves are shown for this lot in Figure 22.

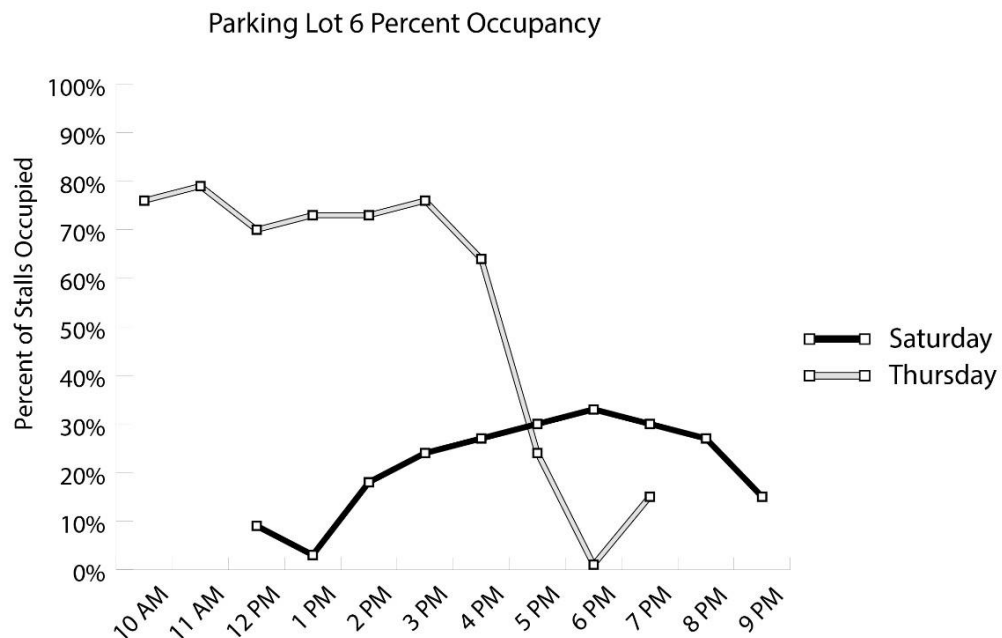


Figure 22: Parking Lot 6 Occupancy



Parking Lot 7

Parking Lot 7 is the library parking lot located on the western side of Birch Street between Pacific Avenue and 19th Avenue, adjacent to the Forest Grove Public Library. This parking lot has approximately 25 parking stalls. Peak hours occurred at 12:00 pm on both Thursday and Saturday. Demand was observed to be much higher on Thursday than on Saturday, which could be due to increased library patronage on weekdays but also likely owes to demand related to Pacific University. Demand for the lot Occupancy curves for this lot are shown Figure 23.

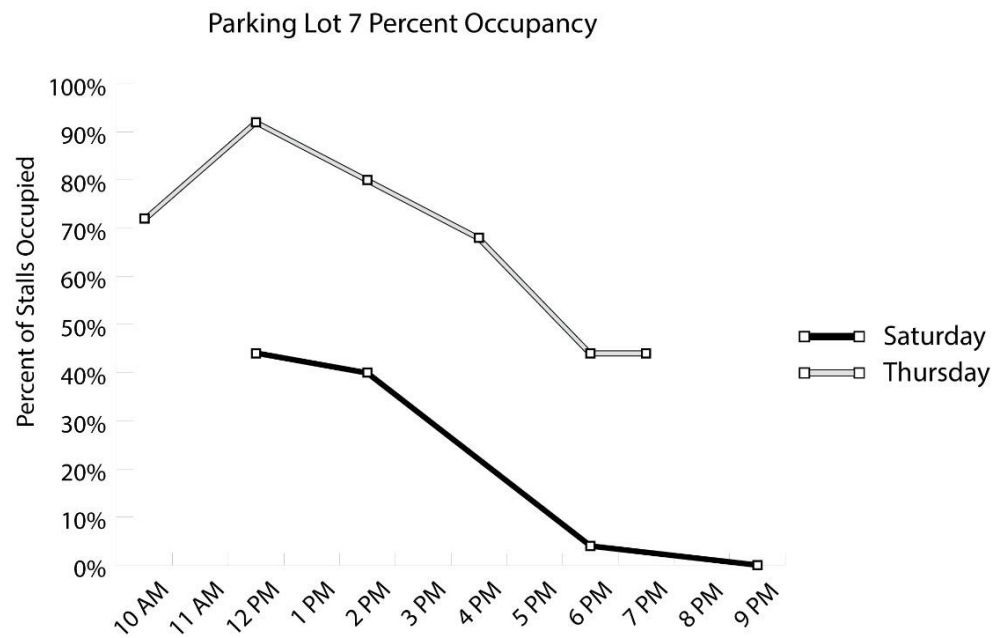


Figure 23: Parking Lot 7 Occupancy



Final Observations and Next Steps

- During both study days, there was sufficient parking within downtown Forest Grove to accommodate all demand during all hours. However there are often localized shortages of parking during the peak hours, where several contiguous blocks are “functionally full” with more than 85% of available parking occupied. The busiest areas generally on or near Main Street, and appear to occur both on typical days and more acutely due to events.
- Existing management measures appear to be producing the desired turnover patterns during typical weekdays; however during the downtown event on Saturday many vehicles were observed to exceed signed time limits and accordingly turnover was relatively light.
- While Pacific University has a large number of off-street spaces that were not considered as part of this study, it appears to be a significant generator of parking demand for publicly available parking within downtown. While parking adjacent to the campus along Pacific Avenue is otherwise lightly utilized, University demand may compete with other downtown demand in other locations including along College Way and within Parking Lot #7 (adjacent to the library).
- The results presented herein point to a number of potential management measures that could help parking within the downtown area function better. Generally, the City should consider a strategy that that helps guide longer-term demand toward the parking lots and on-street parking toward the edges of the downtown area, freeing the most centrally located parking for robust turnover. A number of potential measures can help with this, including wayfinding, better regulation of parking for employees of commercial businesses downtown, increased enforcement (particularly around events), and other placemaking measures (particularly related to the ease and comfort of crossing Pacific Avenue). Moving forward, a detailed set of complementary management initiatives should be developed in consult with the City and stakeholder groups toward this end.



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Appendix: Hourly maps of demand observations

Figure A1: Parking Occupancy - Thursday, 10:00 a.m.

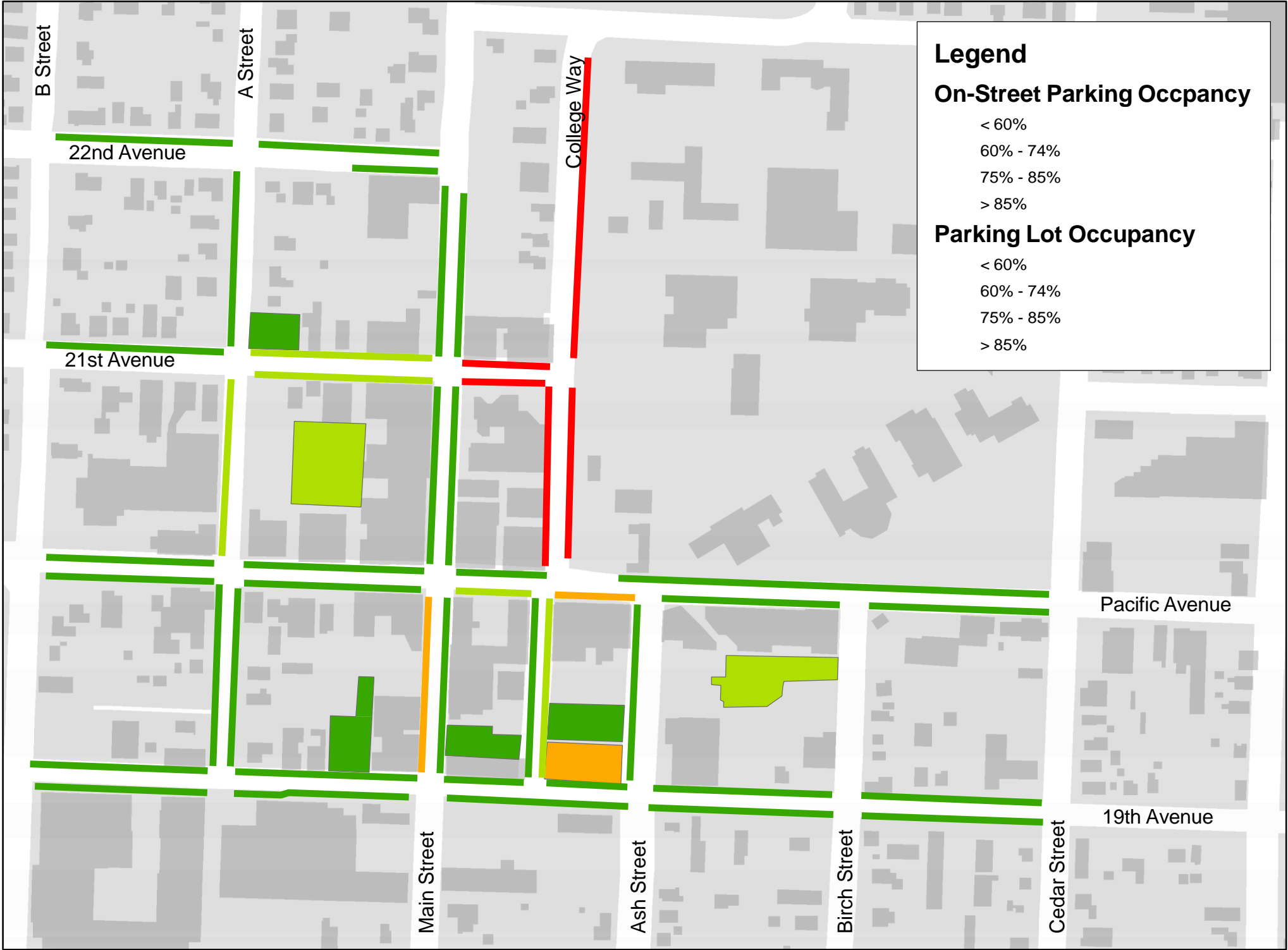


Figure A2: Parking Occupancy - Thursday, 12:00 p.m.

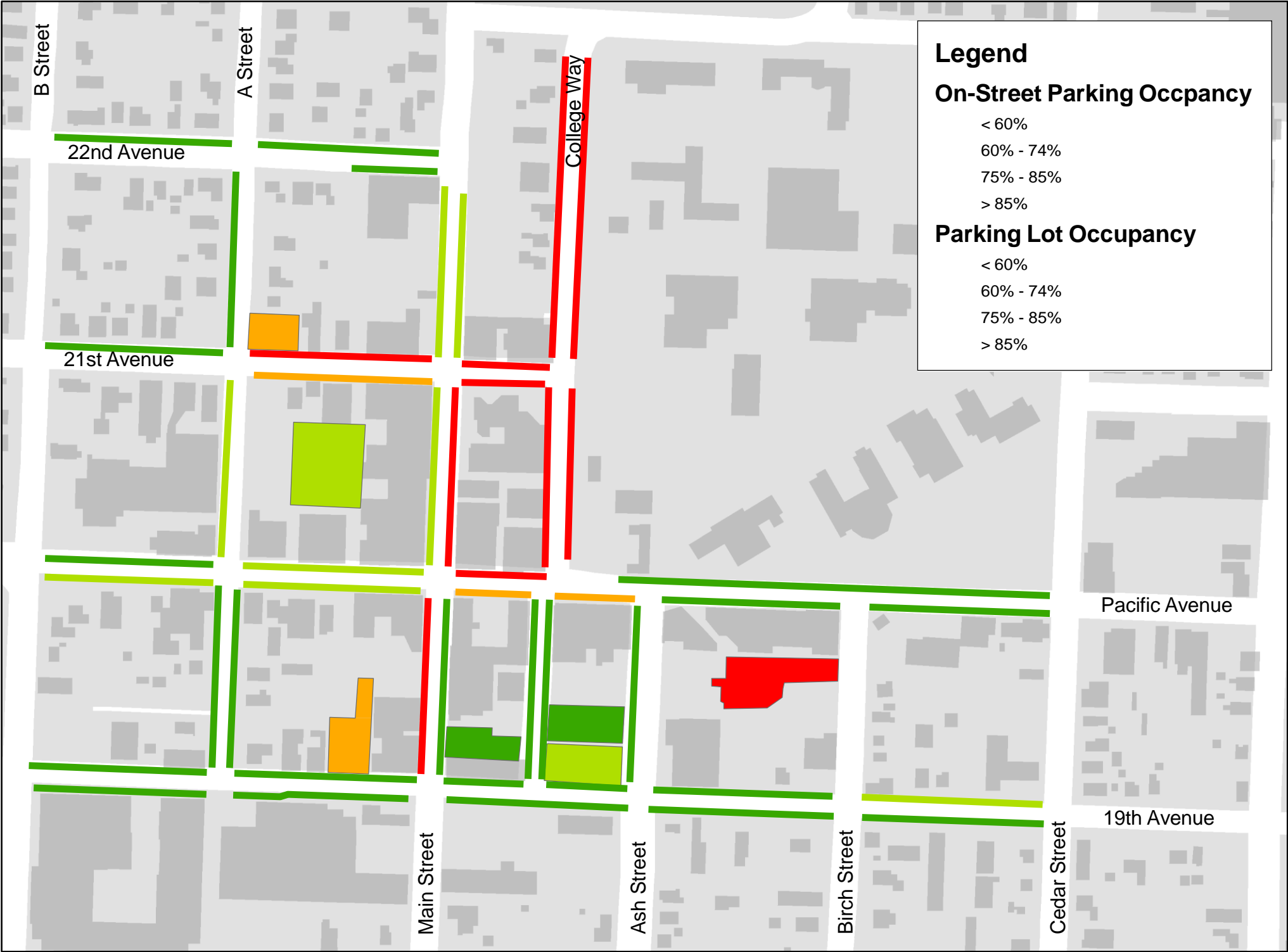


Figure A3: Parking Occupancy - Thursday, 2:00 p.m.

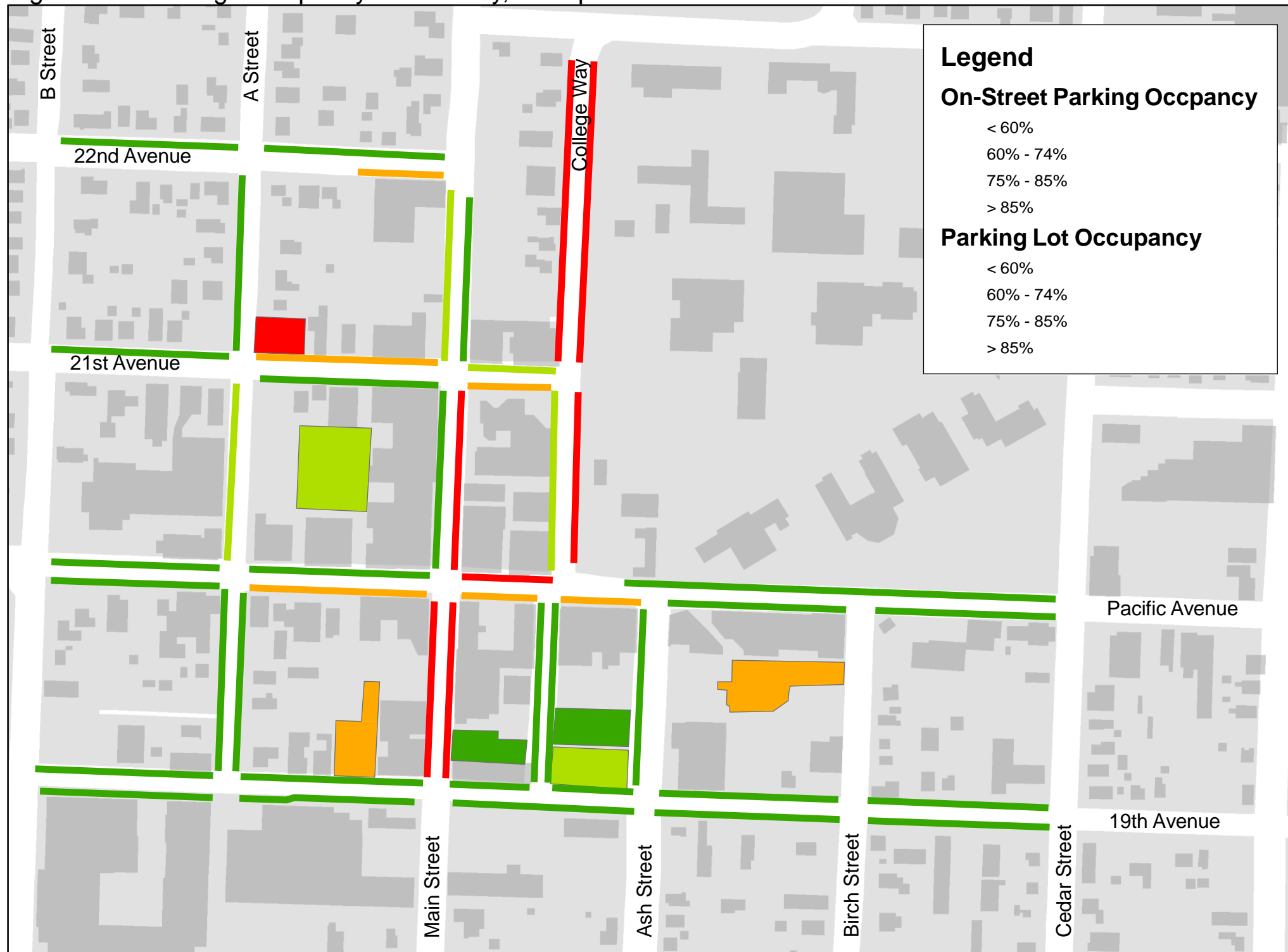


Figure A4: Parking Occupancy - Thursday, 4:00 p.m.

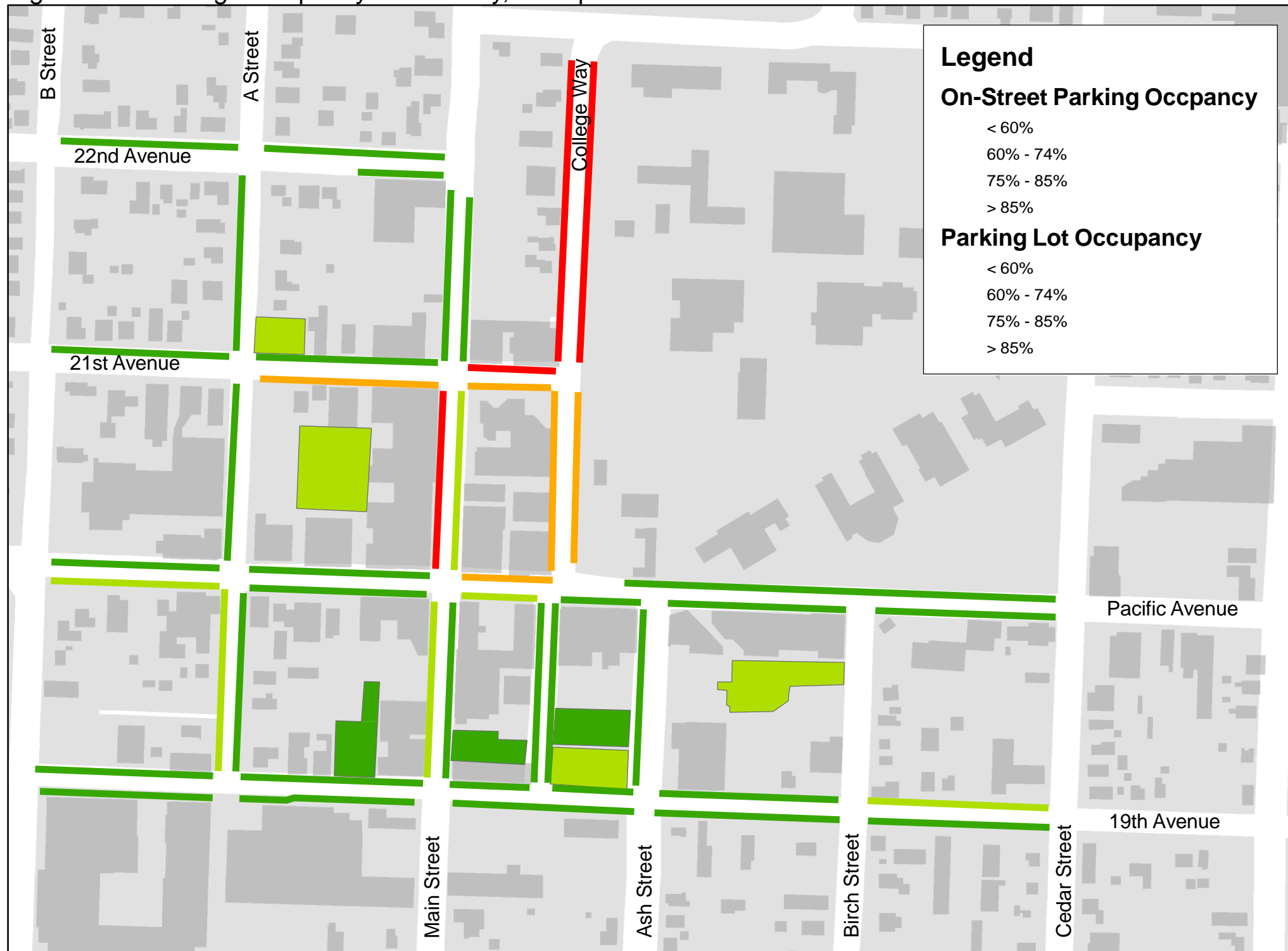


Figure A5: Parking Occupancy - Thursday, 6:00 p.m.

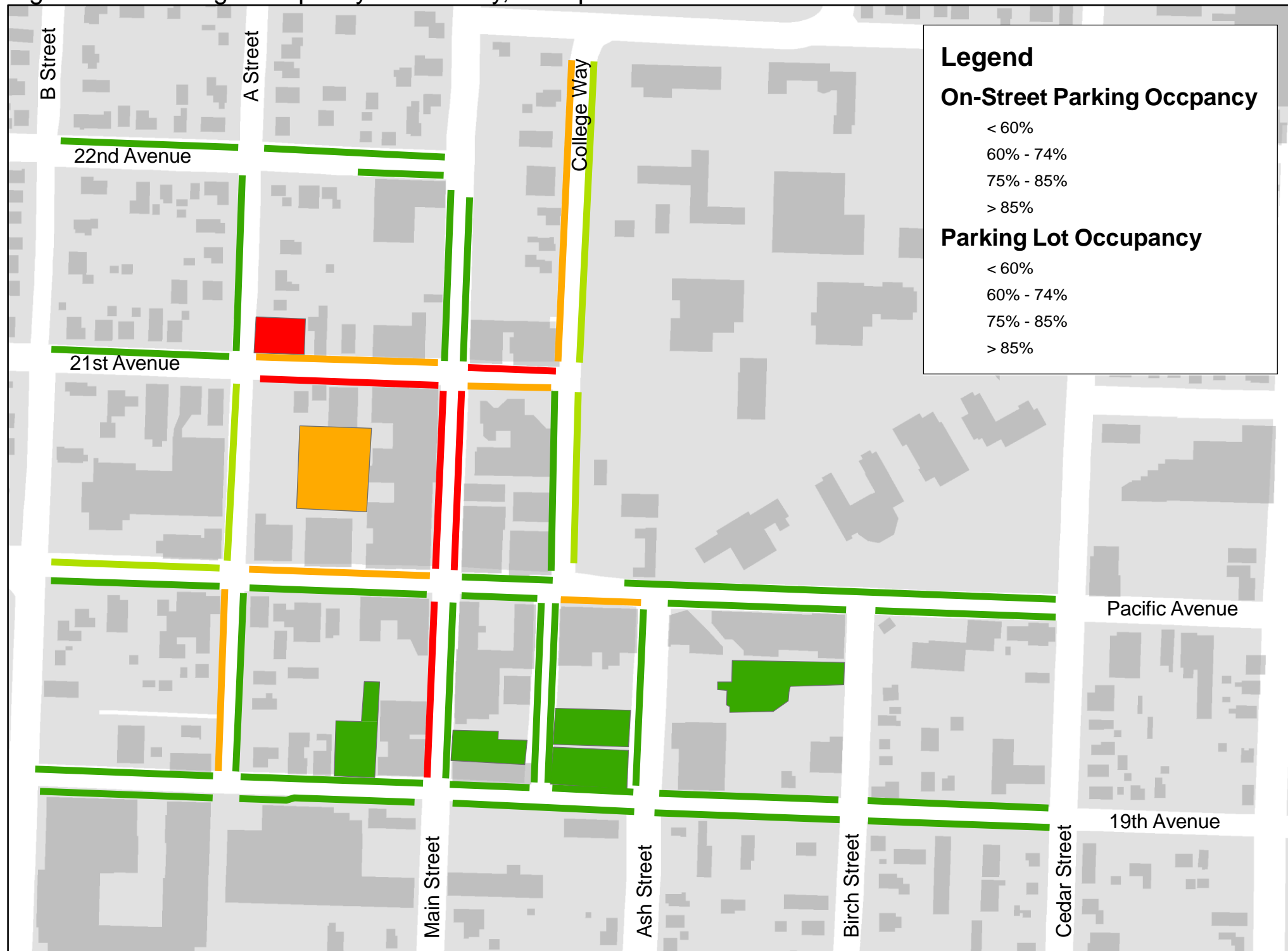


Figure A6: Parking Occupancy - Thursday, 7:00 p.m.

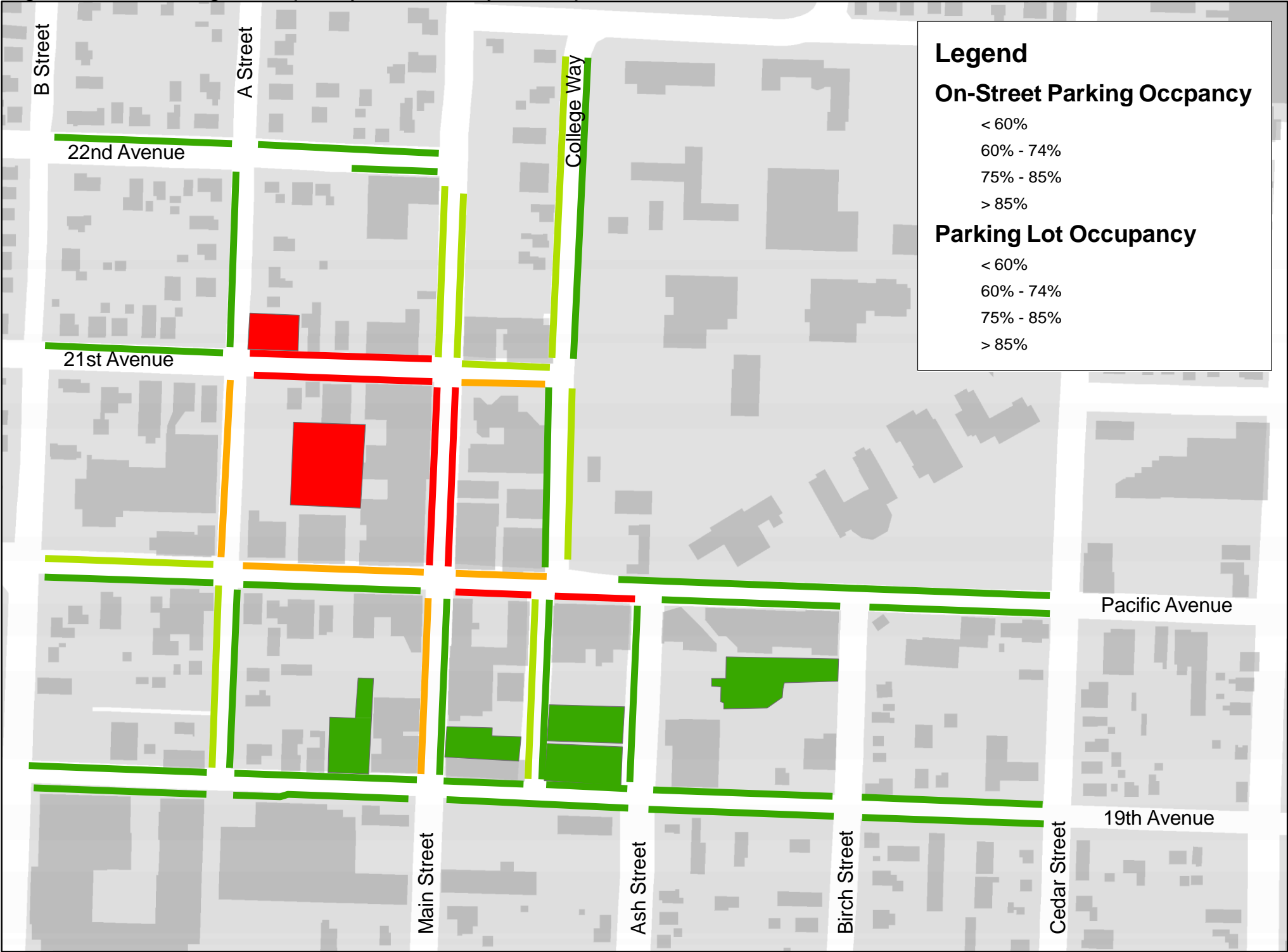


Figure A7: Parking Occupancy - Saturday, 12:00 p.m.

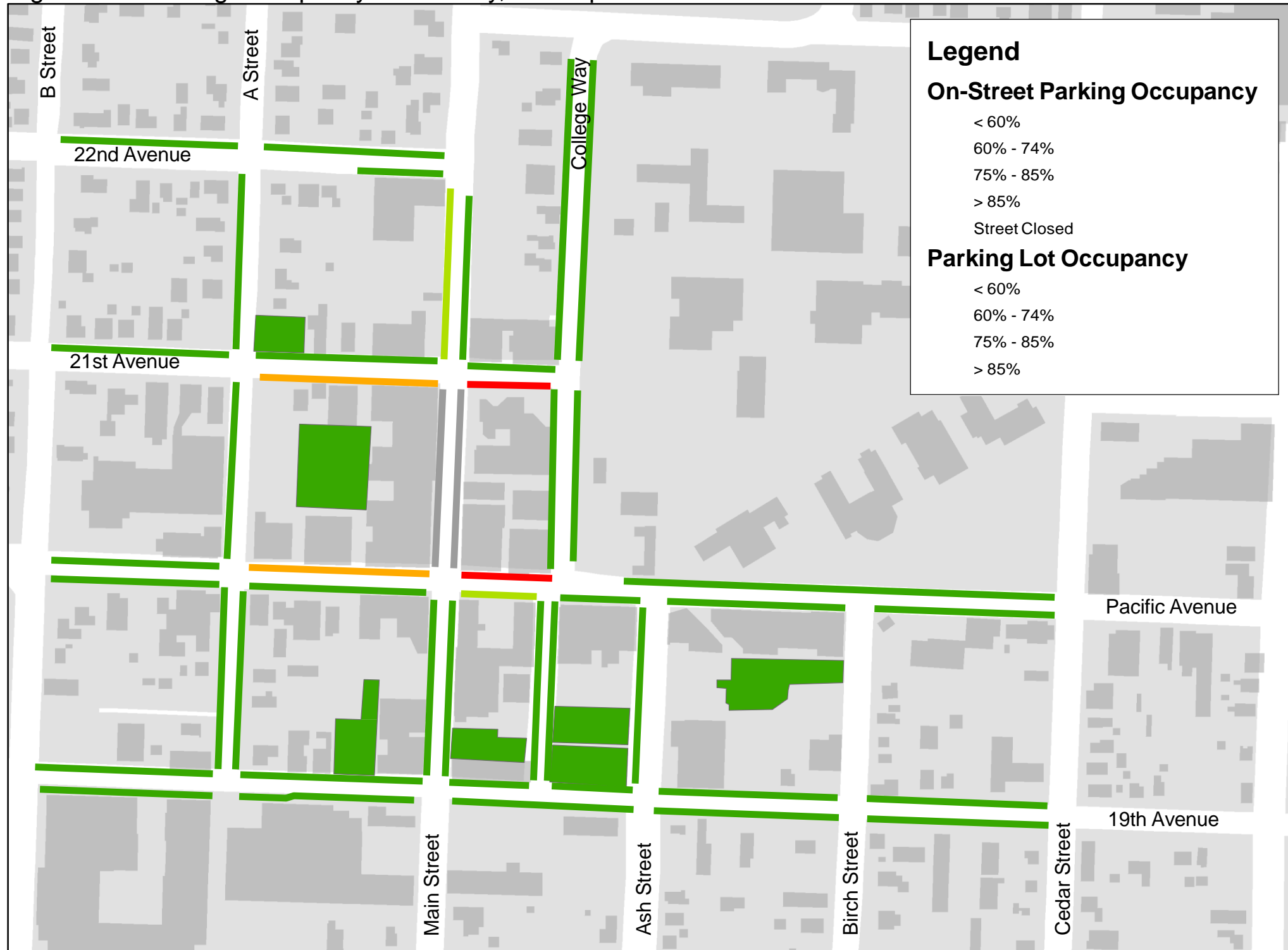


Figure A8: Parking Occupancy - Saturday, 2:00 p.m.



Figure A9: Parking Occupancy - Saturday, 6:00 p.m.



Figure A10: Parking Occupancy - Saturday, 9:00 p.m.

